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HUNTERS POINT
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November 9, 1988

BUILDING 816 - CHARACTERIZATION OF
STORED DRILLING MUDS AND BORING CUTTINGS
NAVAL STATION, TREASURE ISLAND
HUNTERS POINT ANNEX
SAN FRANCISCO, CALIFORNIA

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN BRUNO, CALIFORNIA 94066-0727

A Report Prepared for

United States Navy
Western Division
Naval Facilities Engineering Command
P.O. Box 727
San Bruno, California 94066-0720

**BUILDING 816 - CHARACTERIZATION OF
STORED DRILLING MUDS AND BORING CUTTINGS
NAVAL STATION, TREASURE ISLAND
HUNTERS POINT ANNEX
SAN FRANCISCO, CALIFORNIA**

HLA Job No. 02176,161.02

by

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Staff Geologist II

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November 9, 1988

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1.0 INTRODUCTION

This report presents the results of Harding Lawson Associates' (HLA) investigation of the Building 816 Drum Storage Area at the Naval Station, Treasure Island, Hunters Point Annex (HPA), San Francisco, California (Plate 1). In late October 1987, fifty drums of drilling muds and boring cuttings representing six borings were generated during geotechnical investigations at HPA. These drums are currently stored in Building 816. A characterization of the contents in the drums is required to assess appropriate disposal methods. The drum storage area and drum locations are shown on Plate 2.

The objective of the Building 816 investigation was to identify proper disposal options for the drummed material.

The scope of the investigation consisted of collecting and analyzing ten composite soil samples from drums stored in the drum storage area, and preparation of this report.

2.0 FIELD INVESTIGATION

Ten composite soil samples were collected on May 18, 1988 from 50 drums stored in the Building 816 Drum Storage Area. Sampling personnel were equipped with Level D personal protective equipment, which is described in *Section 7.0 of the Site Safety Plan (HLA 1988a)*. Health and safety monitoring of the work space breathing zone was performed inside Building 816.

All sampling equipment was cleaned using a high pressure steam cleaner prior to use on site. Equipment was wrapped in aluminum foil to minimize cross-contamination during transport to site. Between samples, decontamination was conducted using an Alconox (lab soap) wash and deionized water rinse in accordance with *Section 12.0 of the Quality Assurance Project Plan (QAPP) (HLA, 1988b)*.

Composite drum samples were obtained by removing approximately 250 grams of soil from each drum. A clean stainless steel trowel was used to collect the soil. When water was present above the soil cuttings, a scoop of soil cuttings was removed from the drum with a shovel and a portion of soil was collected from the shovel using the trowel. For each boring, the soil samples from all the drums were combined in a clean plastic bucket and the composite mixed thoroughly. The mixture was then packed into two clean one-quart glass jars. For each of Borings B-1, B-2, B-3, and B-4 two composite samples were collected. A single composite sample was analyzed for the drums containing the cuttings from Boring B-5 and a single composite sample was analyzed for the drums containing the cuttings from the hollow-stem auger (HSA) borings. The sample jars were labeled and stored in an ice chest with blue ice (cooled to approximately 4°C) until delivery to the analytical laboratory, Curtis and Tompkins, Ltd. A single drum from Boring B-1 was not sampled because the drum was filled with trash and a single drum from Boring B-4 was not sampled due to an unremovable drum lid.

Chain of custody forms were completed in the field as specified in Section 13.0 of the QAPP (*HLA, 1988b*). The samples were delivered to the laboratory by the HLA geologist.

Figures 3 and 4 show the distribution of the drums in rooms 1 and 2 of Building 816, respectively. A summary of the drum sampling is presented in Table 1.

3.0 CHEMICAL ANALYSES AND RESULTS

The composite soil samples from the drums were analyzed for total petroleum hydrocarbons (Test Method EPA 3550/8015), pH, corrosivity (Test Method EPA 1110), ignitability (ASTM Method D92), reactivity, sulfide (SMWW Method 427D), cyanide (SMWW Method 412J), CAM 17 Metals (EPA Test Methods 7040, 6010, 7080, 7090, 6010, 7470, 7840), and organochlorine pesticides and PCBs (EPA Test Method 8080).

Table 2 summarizes the analytical results for those analytes detected. The laboratory report and chain of custody form are presented in the Appendix.

Metals detected were within the range of background concentrations for soils at HPA except in Boring B-5, which contained elevated concentrations of copper, lead, mercury, molybdenum, selenium, and zinc. However, the detected metals for all analyses were below the Total Threshold Level Concentration values (*State of California, 1985*) except for a slightly elevated level of selenium in Boring B-5. Other analyses were either negative (corrosivity, ignitability, and reactivity) or concentrations were below detection limits (EPA 8080, EPA 8015, sulfide, and cyanide).

4.0 DISCUSSION AND RECOMMENDATIONS

The chemical results of the analyses performed on the composite soil samples indicate that the contents of the drums stored in Building 816 contain low levels of metals. Analysis of these soils for total petroleum hydrocarbons, PCBs or pesticides, cyanides, and sulfides all yielded non-detectable concentrations. In addition, the soils did not contain abnormal soil pH, corrosivity, or ignitability values.

The analytical results from 8 of 9 drums collected from Boring B-4 cuttings (Sample D04A and D04B) indicate that no elevated levels of chemical compounds were detected at this location. Therefore, it could be assumed that the unsampled drum from Boring B-4 also does not contain elevated chemical concentrations and can be handled as the eight Boring B-4 sampled drums; conversely, sampling and analysis of the unsampled drum would answer any questions as to its contents. According to the analyses and results presented herein, the drums and their contents pose no immediate threat to public health or the environment. The metal concentrations detected in these soils were below the CAM 17 limits (TTLC) except for selenium in Boring B-5. The TTLC for selenium is 100 mg/kg; the B-5 concentration was 110 mg/kg.

On the basis of the samples and analyses performed, the contents of the 50 drums containing soil cuttings from the HPA geotechnical investigation could be removed from the drums and handled as nonhazardous soil cuttings.

5.0 REFERENCES

HLA, 1988a *Site Safety Plan, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California. January 14.*

HLA, 1988b *Quality Assurance Project Plan (QAPP), Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California. May 26.*

State of California, 1985. *California Code of Regulations, Title 22, Section 66699.*

Harding Lawson Associates

TABLES

Table 1. Drum Sampling Summary

Drum Label	Number of Drums	Sample Numbers
B-1	10 ^a	D01A, D01B
B-2	12	D02A, D02B
B-3	11	D03A, D03B
B-4	9 ^b	D04A, D04B
B-5	5	D005
HSA	3	DHSA

a One drum not sampled - container inaccessible

b One drum not sampled - filled with trash

TABLE 2. SELECTED BUILDING 816 DRUM STORAGE AREA ANALYTICAL RESULTS

CAM 17 Metals in Soils and Wastes
Digestion Method: EPA 3050

METAL	METHOD	TTL ^a mg/kg	DETECTION LIMIT mg/kg	SAMPLE NUMBERS									
				Boring 8-1		Boring 8-2		Boring 8-3		Boring 8-4		Boring 8-5	
				D01A mg/kg	D01B mg/kg	D02A mg/kg	D02B mg/kg	D03A mg/kg	D03B mg/kg	D04A mg/kg	D04B mg/kg	DHSA mg/kg	D005 mg/kg
Antimony	EPA 7040	500	3.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	EPA 6010	500	1.3	20	21	21	22	23	26	18	18	82	20
Barium	EPA 7080	10,000	7.5	140	190	190	63	25	20	24	44	53	32
Beryllium	EPA 7090	75	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	EPA 6010	100	0.3	0.9	1.0	1.5	1.4	1.2	2.0	1.5	1.5	3.0	1.1
Chromium (total)	EPA 6010	2,500	0.5	27	30	46	48	34	45	54	55	67	39
Cobalt	EPA 6010	8,000	0.5	6.2	6.8	11	10	8.6	12	10	14	17.1	7.0
Copper	EPA 6010	2,500	0.5	5.3	5.7	21	5.0	12	20	5.1	4.3	220	6.0
Lead	EPA 6010	1,000	3.0	12	26	14	14	15	37	12	12	94	13
Mercury	EPA 7470	20	0.1	ND	ND	ND	ND	ND	ND	ND	ND	0.2	ND
Molybdenum	EPA 6010	3,500	0.5	3.1	3.4	3.9	3.8	3.8	9.0	3.4	3.6	13	3.3
Nickel	EPA 6010	2,000	0.5	68	75	190	157	95	88	160	173	120	90
Selenium	EPA 6010	100	3.0	34	37	46	44	39	73	37	39	110	35
Silver	EPA 6010	500	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.9
Thallium	EPA 7840	700	3.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	EPA 6010	2,400	0.5	8.4	8.8	7.9	8.3	9.7	24	5.5	5.7	47	6.3
Zinc	EPA 6010	5,000	0.5	15	15	13	15	34	43	14	13	200	14

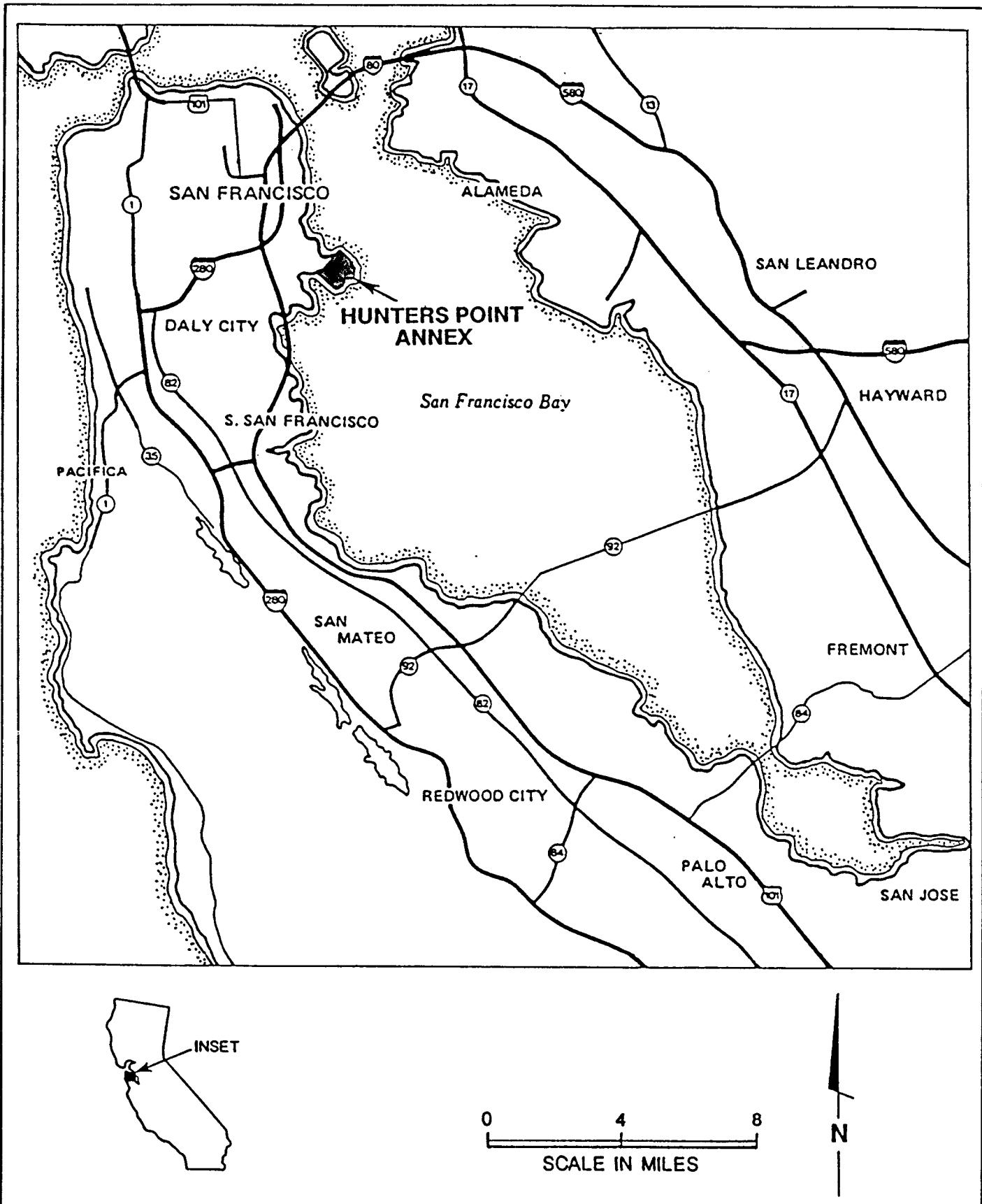
ND = Not detected above detection limit

mg/kg = milligram per kilogram

a = Total Threshold Level Concentrations as specified in Title 22, California code of Regulations

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ILLUSTRATIONS



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Engineers and Geoscientists

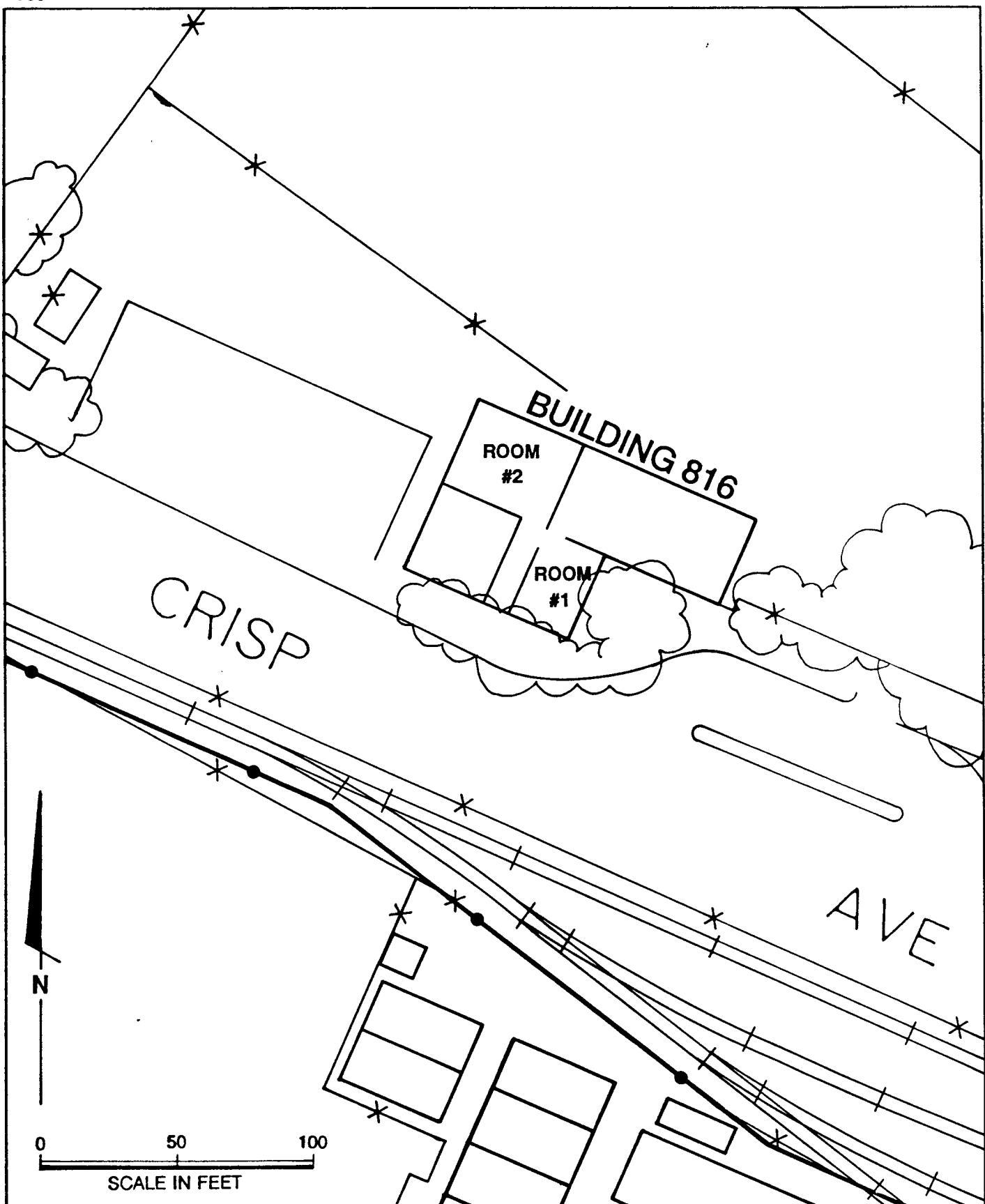
Location Map
Building 816 - Drum Sampling
Hunters Point Annex
San Francisco, California

PLATE

1DRAWN
MLJOB NUMBER
2176,161.02APPROVED
*[Signature]*DATE
6/88

REVISED

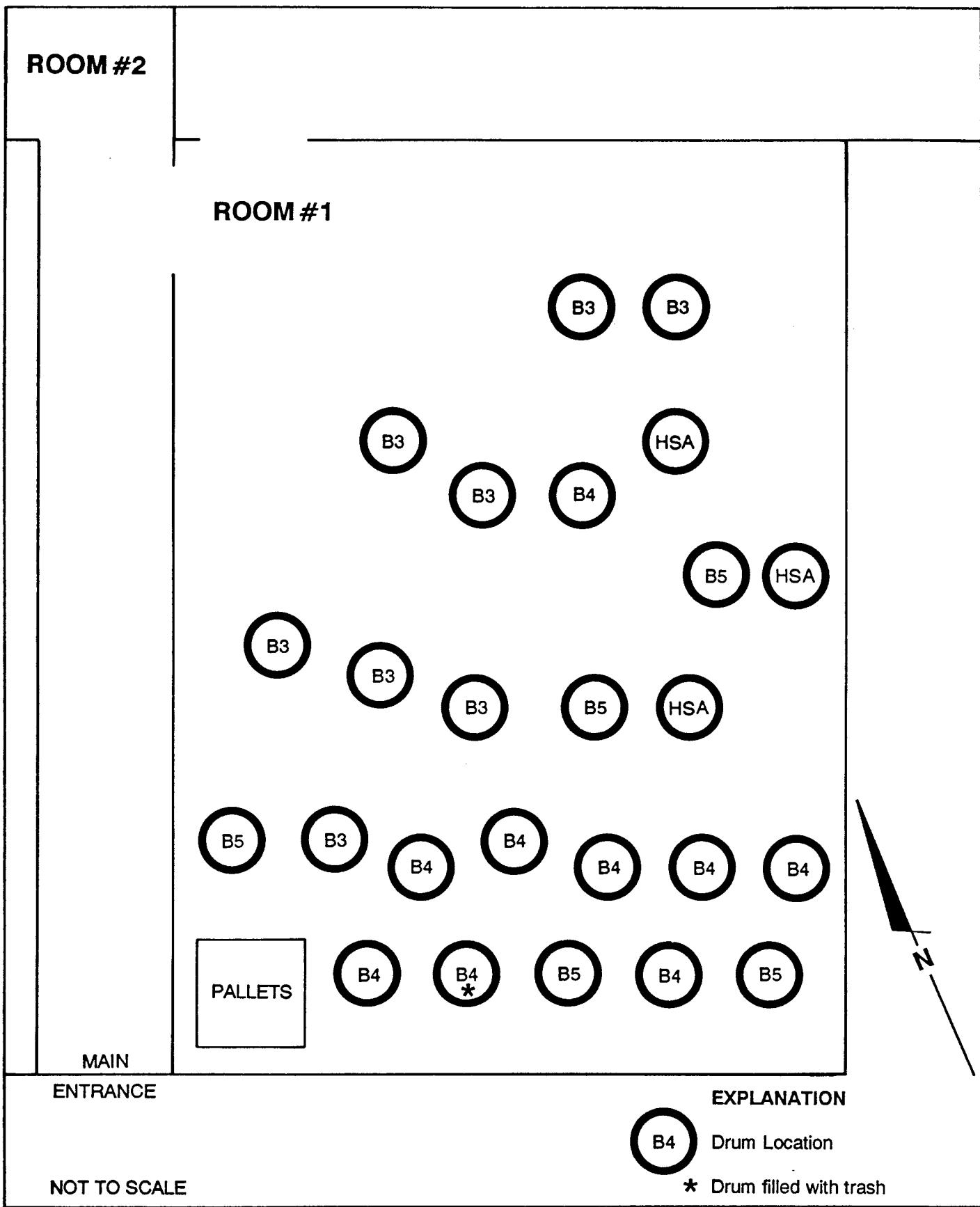
DATE



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Site Map
Building 816 - Drum Sampling
Hunters Point Annex
San Francisco, California

PLATE
2



Harding Lawson Associates
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Room #1 Drum Plan
Building 816 - Drum Sampling
Hunters Point Annex
San Francisco, California

PLATE

3

DRAWN
ML

JOB NUMBER
2176,161.02

APPROVED
[Signature]

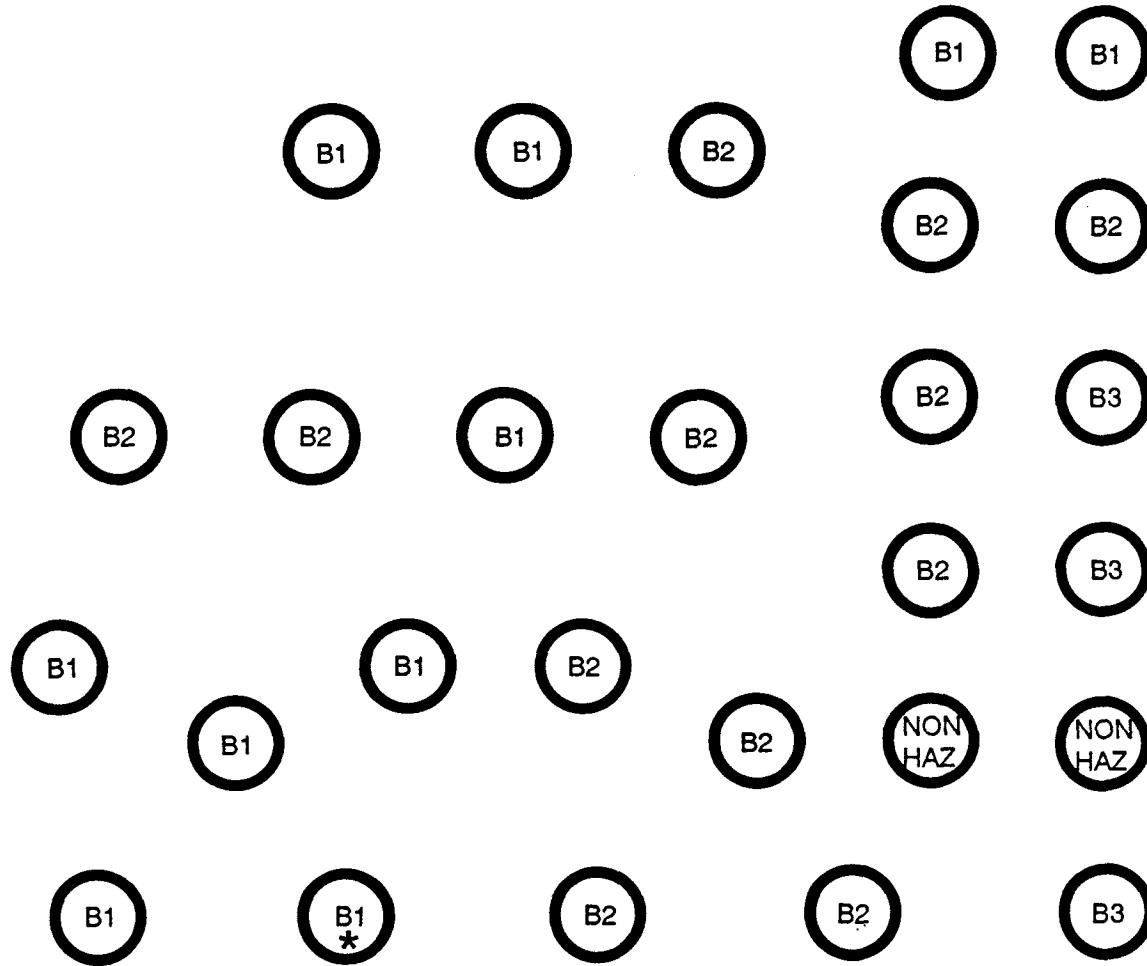
DATE
6/88

REVISED

DATE

EMERGENCY
EXIT DOOR

ROOM #2



EXPLANATION



Drum Location



Previously Sampled
Non-Hazardous Drum

* Not accessible,
not sampled.

NOT TO SCALE

TO
MAIN
ENTRANCE

ROOM
#1



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Room #2 Drum Plan
Building 816 - Drum Sampling
Hunters Point Annex
San Francisco, California

PLATE
4

DRAWN
ML

JOB NUMBER
2176,161.02

APPROVED
[Signature]

DATE
6/88

REVISED
DATE

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Appendix

LABORATORY REPORTS AND CHAIN OF CUSTODY FORM



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

290 Division Street, San Francisco, CA 94103, Phone (415) 861-1863

JOB NUMBER: 14731
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
DATE ANALYZED: 05/23/88
DATE REPORTED: 06/03/88
PAGE 1 OF 23

Results of Analysis for Petroleum Hydrocarbons in Soils and Wastes

Method References: TPH: Total Petroleum Hydrocarbons, EPA 3550/8015

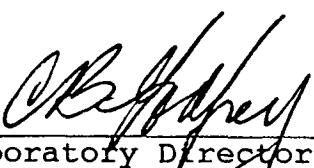
LAB ID	SAMPLE ID	GASOLINE (mg/Kg)	KEROSINE (mg/Kg)	DIESEL (mg/Kg)
14731-1	8899D01A	ND(10)	ND(10)	ND(10)
14731-2	8899D01B	ND(10)	ND(10)	ND(10)
14731-3	8899D02A	ND(10)	ND(10)	ND(10)
14731-4	8899D02B	ND(10)	ND(10)	ND(10)
14731-5	8899D03A	ND(10)	ND(10)	ND(10)
14731-6	8899D03B	ND(10)	ND(10)	ND(10)
14731-7	8899D04A	ND(10)	ND(10)	ND(10)
14731-8	8899D04B	ND(10)	ND(10)	ND(10)
14731-9	8899DHSA	ND(10)	ND(10)	ND(10)
14731-10	8899D005	ND(10)	ND(10)	ND(10)

ND = NONE DETECTED. LIMIT OF DETECTION IS INDICATED IN PARENTHESES.

QA/QC SUMMARY

Duplicate: Relative % Difference
Spike: % Recovery

2
115


Laboratory Director

San Francisco

Wilmington

Los Angeles

LABORATORY NUMBER: 14731
 CLIENT: HARDING LAWSON ASSOCIATES
 JOB ID: 2176, 161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
 DATE ANALYZED: 06/01/88
 DATE REPORTED:
 PAGE 2 OF 23

C&T ID	CLIENT ID	pH, SU EPA 9045	CORROSIVITY TO STEEL, mm per year EPA 1110	IGNITABILITY ASTM D92
14731-1	8899D01A	12.5	NEGATIVE	>200 DEGREES F
14731-2	8899D01B	12.5	NEGATIVE	>200 DEGREES F
14731-3	8899D02A	12.3	NEGATIVE	>200 DEGREES F
14731-4	8899D02B	12.0	NEGATIVE	>200 DEGREES F
14731-5	8899D03A	9.8	NEGATIVE	>200 DEGREES F
14731-6	8899D03B	9.5	NEGATIVE	>200 DEGREES F
14731-7	8899D04A	12.7	NEGATIVE	>200 DEGREES F
14731-8	8899D04B	12.7	NEGATIVE	>200 DEGREES F
14731-9	8899DHSA	8.4	NEGATIVE	>200 DEGREES F
14731-10	8899D005	12.5	NEGATIVE	>200 DEGREES F

LABORATORY NUMBER: 14731
 CLIENT: HARDING LAWSON ASSOCIATES
 JOB ID: 2176, 161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
 DATE ANALYZED: 06/01/88
 DATE REPORTED:
 PAGE 3 OF 23

C&T ID	CLIENT ID	REACTIVITY TO AIR & WATER	SULFIDE(mg/Kg) SMWW 427D	CYANIDE(mg/Kg) SMWW 412J
14731-1	8899DO1A	NEGATIVE	ND(5)	ND(0.05)
14731-2	8899DO1B	NEGATIVE	ND(5)	ND(0.05)
14731-3	8899DO2A	NEGATIVE	ND(5)	ND(0.05)
14731-4	8899DO2B	NEGATIVE	ND(5)	ND(0.05)
14731-5	8899DO3A	NEGATIVE	ND(5)	ND(0.05)
14731-6	8899DO3B	NEGATIVE	ND(5)	ND(0.05)
14731-7	8899DO4A	NEGATIVE	ND(5)	ND(0.05)
14731-8	8899DO4B	NEGATIVE	ND(5)	ND(0.05)
14731-9	8899DHSA	NEGATIVE	ND(5)	ND(0.05)
14731-10	8899DO05	NEGATIVE	ND(5)	ND(0.05)

ND = Not Detected; Limit of Detection indicated in parentheses.

LABORATORY NUMBER: 14731-1
 CLIENT: Harding Lawson Associates
 SAMPLE ID: 8899D01A
 HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
 DATE ANALYZED: 05/24/88
 DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
 Digestion Method: EPA 3050

METAL	RESULT	DETECTION LIMIT	METHOD
	mg/Kg	mg/Kg	
Antimony	ND	3.0	EPA 7040
Arsenic	20	1.3	EPA 6010
Barium	140	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	0.9	0.3	EPA 6010
Chromium (total)	27	0.5	EPA 6010
Cobalt	6.2	0.5	EPA 6010
Copper	5.3	0.5	EPA 6010
Lead	12	3.0	EPA 6010
Mercury	ND	0.1	EPA 7470
Molybdenum	3.1	0.5	EPA 6010
Nickel	68	0.5	EPA 6010
Selenium	34	3.0	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	8.4	0.5	EPA 6010
Zinc	15	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14731-2
CLIENT: Harding Lawson Associates
SAMPLE ID: 8899D01B
HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
DATE ANALYZED: 05/24/88
DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT	DETECTION LIMIT	METHOD
	mg/Kg	mg/Kg	
Antimony	ND	3.0	EPA 7040
Arsenic	21	1.3	EPA 6010
Barium	190	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	1.0	0.3	EPA 6010
Chromium (total)	30	0.5	EPA 6010
Cobalt	6.8	0.5	EPA 6010
Copper	5.7	0.5	EPA 6010
Lead	26	3.0	EPA 6010
Mercury	ND	0.1	EPA 7470
Molybdenum	3.4	0.5	EPA 6010
Nickel	75	0.5	EPA 6010
Selenium	37	3.0	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	8.8	0.5	EPA 6010
Zinc	15	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

%RPD	%SPIKE		%RPD	%SPIKE	
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14731-3
CLIENT: Harding Lawson Associates
SAMPLE ID: 8899D02A
HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
DATE ANALYZED: 05/24/88
DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT	DETECTION LIMIT	METHOD
	mg/Kg	mg/Kg	
Antimony	ND	3.0	EPA 7040
Arsenic	21	1.3	EPA 6010
Barium	190	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	1.5	0.3	EPA 6010
Chromium (total)	46	0.5	EPA 6010
Cobalt	11	0.5	EPA 6010
Copper	21	0.5	EPA 6010
Lead	14	3.0	EPA 6010
Mercury	ND	0.1	EPA 7470
Molybdenum	3.9	0.5	EPA 6010
Nickel	190	0.5	EPA 6010
Selenium	46	3.0	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	7.9	0.5	EPA 6010
Zinc	13	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14731-4
CLIENT: Harding Lawson Associates
SAMPLE ID: 8899D02B
HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
DATE ANALYZED: 05/24/88
DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT	DETECTION LIMIT	METHOD
	mg/Kg	mg/Kg	
Antimony	ND	3.0	EPA 7040
Arsenic	22	1.3	EPA 6010
Barium	63	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	1.4	0.3	EPA 6010
Chromium (total)	48	0.5	EPA 6010
Cobalt	10	0.5	EPA 6010
Copper	5.0	0.5	EPA 6010
Lead	14	3.0	EPA 6010
Mercury	ND	0.1	EPA 7470
Molybdenum	3.8	0.5	EPA 6010
Nickel	157	0.5	EPA 6010
Selenium	44	3.0	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	8.3	0.5	EPA 6010
Zinc	15	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			

LABORATORY NUMBER: 14731-5
 CLIENT: Harding Lawson Associates
 SAMPLE ID: 8899D03A
 HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
 DATE ANALYZED: 05/24/88
 DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
 Digestion Method: EPA 3050

METAL	RESULT	DETECTION	METHOD
		LIMIT	
		mg/Kg	mg/Kg
Antimony	ND	3.0	EPA 7040
Arsenic	23	1.3	EPA 6010
Barium	25	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	1.2	0.3	EPA 6010
Chromium (total)	34	0.5	EPA 6010
Cobalt	8.6	0.5	EPA 6010
Copper	12	0.5	EPA 6010
Lead	15	3.0	EPA 6010
Mercury	ND	0.1	EPA 7470
Molybdenum	3.8	0.5	EPA 6010
Nickel	95	0.5	EPA 6010
Selenium	39	3.0	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	9.7	0.5	EPA 6010
Zinc	34	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			

LABORATORY NUMBER: 14731-6
 CLIENT: Harding Lawson Associates
 SAMPLE ID: 8899D03B
 HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
 DATE ANALYZED: 05/24/88
 DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
 Digestion Method: EPA 3050

METAL	RESULT	DETECTION	METHOD
		LIMIT	
	mg/Kg	mg/Kg	
Antimony	ND	3.0	EPA 7040
Arsenic	66	1.3	EPA 6010
Barium	20	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	2.0	0.3	EPA 6010
Chromium (total)	45	0.5	EPA 6010
Cobalt	12	0.5	EPA 6010
Copper	20	0.5	EPA 6010
Lead	37	3.0	EPA 6010
Mercury	ND	0.1	EPA 7470
Molybdenum	9.0	0.5	EPA 6010
Nickel	88	0.5	EPA 6010
Selenium	73	3.0	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	24	0.5	EPA 6010
Zinc	43	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			

LABORATORY NUMBER: 14731-7
 CLIENT: Harding Lawson Associates
 SAMPLE ID: 8899D04A
 HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
 DATE ANALYZED: 05/24/88
 DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
 Digestion Method: EPA 3050

METAL	RESULT	DETECTION LIMIT	METHOD
	mg/Kg	mg/Kg	
Antimony	ND	3.0	EPA 7040
Arsenic	18	1.3	EPA 6010
Barium	24	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	1.5	0.3	EPA 6010
Chromium (total)	54	0.5	EPA 6010
Cobalt	10	0.5	EPA 6010
Copper	5.1	0.5	EPA 6010
Lead	12	3.0	EPA 6010
Mercury	ND	0.1	EPA 7470
Molybdenum	3.4	0.5	EPA 6010
Nickel	160	0.5	EPA 6010
Selenium	37	3.0	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	5.5	0.5	EPA 6010
Zinc	14	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14731-8
CLIENT: Harding Lawson Associates
SAMPLE ID: 8899D04B
HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
DATE ANALYZED: 05/24/88
DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT	DETECTION LIMIT	METHOD
	mg/Kg	mg/Kg	
Antimony	ND	3.0	EPA 7040
Arsenic	18	1.3	EPA 6010
Barium	44	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	1.5	0.3	EPA 6010
Chromium (total)	55	0.5	EPA 6010
Cobalt	14	0.5	EPA 6010
Copper	4.3	0.5	EPA 6010
Lead	12	3.0	EPA 6010
Mercury	ND	0.1	EPA 7470
Molybdenum	3.6	0.5	EPA 6010
Nickel	173	0.5	EPA 6010
Selenium	39	3.0	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	5.7	0.5	EPA 6010
Zinc	13	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14731-9
CLIENT: Harding Lawson Associates
SAMPLE ID: 8899DHSA
HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
DATE ANALYZED: 05/24/88
DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT	DETECTION LIMIT	METHOD
	mg/Kg	mg/Kg	
Antimony	ND	3.0	EPA 7040
Arsenic	82	1.3	EPA 6010
Barium	53	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	3.0	0.3	EPA 6010
Chromium (total)	67	0.5	EPA 6010
Cobalt	17.1	0.5	EPA 6010
Copper	220	0.5	EPA 6010
Lead	94	3.0	EPA 6010
Mercury	0.2	0.1	EPA 7470
Molybdenum	13	0.5	EPA 6010
Nickel	120	0.5	EPA 6010
Selenium	110	3.0	EPA 6010
Silver	ND	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	47	0.5	EPA 6010
Zinc	200	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14731-10
CLIENT: Harding Lawson Associates
SAMPLE ID: 8899D005
HLA Job #: 2176,161.02 Hunters Point

DATE RECEIVED: 05/19/88
DATE ANALYZED: 05/24/88
DATE REPORTED: 06/03/88
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CAM 17 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT	DETECTION LIMIT	METHOD
	mg/Kg	mg/Kg	
Antimony	ND	3.0	EPA 7040
Arsenic	20	1.3	EPA 6010
Barium	32	7.5	EPA 7080
Beryllium	ND	0.5	EPA 7090
Cadmium	1.1	0.3	EPA 6010
Chromium (total)	39	0.5	EPA 6010
Cobalt	7.0	0.5	EPA 6010
Copper	6.0	0.5	EPA 6010
Lead	13	3.0	EPA 6010
Mercury	ND	0.1	EPA 7470
Molybdenum	3.3	0.5	EPA 6010
Nickel	90	0.5	EPA 6010
Selenium	35	3.0	EPA 6010
Silver	1.9	1.0	EPA 6010
Thallium	ND	3.0	EPA 7840
Vanadium	6.3	0.5	EPA 6010
Zinc	14	0.5	EPA 6010

ND = None Detected

QA/QC SUMMARY

	%RPD	%SPIKE		%RPD	%SPIKE
Antimony	<1	98	Mercury	20	108
Arsenic	12	99	Molybdenum	15	105
Barium	21	117	Nickel	<1	100
Beryllium	<1	80	Selenium	12	98
Cadmium	15	85	Silver	<1	110
Chromium	8	79	Thallium	<1	100
Cobalt	4	100	Vanadium	26	99
Copper	<1	105	Zinc	<1	103
Lead	<1	102			

LABORATORY NUMBER: 14731-1
 CLIENT: HARDING LAWSON ASSOCIATES
 SAMPLE ID: 8899D01A
 JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
 DATE EXTRACTED: 06/01/88
 DATE ANALYZED: 06/02/88
 DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
 Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference	1
Average Spike Recovery %	95

LABORATORY NUMBER: 14731-2
 CLIENT: HARDING LAWSON ASSOCIATES
 SAMPLE ID: 8899D01B
 JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
 DATE EXTRACTED: 06/01/88
 DATE ANALYZED: 06/02/88
 DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
 Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference	1
Average Spike Recovery %	95

LABORATORY NUMBER: 14731-3
 CLIENT: HARDING LAWSON ASSOCIATES
 SAMPLE ID: 8899DO2A
 JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
 DATE EXTRACTED: 06/01/88
 DATE ANALYZED: 06/02/88
 DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
 Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference
 Average Spike Recovery %

1
 95

LABORATORY NUMBER: 14731-4
CLIENT: HARDING LAWSON ASSOCIATES
SAMPLE ID: 8899DO2B
JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
DATE EXTRACTED: 06/01/88
DATE ANALYZED: 06/02/88
DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference
Average Spike Recovery %

1
95

LABORATORY NUMBER: 14731-5
CLIENT: HARDING LAWSON ASSOCIATES
SAMPLE ID: 8899DO3A
JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
DATE EXTRACTED: 06/01/88
DATE ANALYZED: 06/02/88
DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference
Average Spike Recovery %

1
95

LABORATORY NUMBER: 14731-6
 CLIENT: HARDING LAWSON ASSOCIATES
 SAMPLE ID: 8899D03B
 JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
 DATE EXTRACTED: 06/01/88
 DATE ANALYZED: 06/02/88
 DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
 Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference
 Average Spike Recovery %

1
 95

LABORATORY NUMBER: 14731-7
 CLIENT: HARDING LAWSON ASSOCIATES
 SAMPLE ID: 8899DO4A
 JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
 DATE EXTRACTED: 06/01/88
 DATE ANALYZED: 06/02/88
 DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
 Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference	1
Average Spike Recovery %	95

LABORATORY NUMBER: 14731-8
 CLIENT: HARDING LAWSON ASSOCIATES
 SAMPLE ID: 8899DO4B
 JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
 DATE EXTRACTED: 06/01/88
 DATE ANALYZED: 06/02/88
 DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
 Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference
 Average Spike Recovery %

1
 95



Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14731-9
CLIENT: HARDING LAWSON ASSOCIATES
SAMPLE ID: 8899DHSA
JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
DATE EXTRACTED: 06/01/88
DATE ANALYZED: 06/02/88
DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference	1
Average Spike Recovery %	95

LABORATORY NUMBER: 14731-10
 CLIENT: HARDING LAWSON ASSOCIATES
 SAMPLE ID: 8899D0005
 JOB #: 2176,161.02, HUNTERS POINT

DATE RECEIVED: 05/19/88
 DATE EXTRACTED: 06/01/88
 DATE ANALYZED: 06/02/88
 DATE REPORTED: 06/03/88
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EPA 8080: Organochlorine Pesticides and PCBs in Soil & Wastes
 Extraction Method: EPA 3580-Waste Dilution

COMPOUND	Result (mg/kg)	Detection Limit (mg/kg)
alpha-BHC	ND	0.05
beta-BHC	ND	0.05
gamma-BHC	ND	0.05
delta-BHA	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.05
pp-DDE	ND	0.05
Dieldrin	ND	0.05
Endrin	ND	0.05
Endosulfan II	ND	0.05
pp-DDD	ND	0.05
Endrin Ketone	ND	0.05
Endosulfan Sulfate	ND	0.05
pp-DDT	ND	0.05
Chlordane	ND	0.5
Toxaphene	ND	0.5
Methoxychlor	ND	0.5
PCB 1016	ND	0.5
PCB 1221	ND	0.5
PCB 1232	ND	0.5
PCB 1242	ND	0.5
PCB 1248	ND	0.5
PCB 1254	ND	0.5
PCB 1260	ND	0.5

ND = Not detected. Limit of detection appears right column.

QA/QC:

Duplicate: Relative % Difference
 Average Spike Recovery %

1
 95

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QUALITY CONTROL REVIEWER

Lisa S. Teague

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Geologist - 3839